

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Concrete is a common and important material which is used extensively in constructing structural building, from basic concrete mixing work to high-rise structure in the construction industry. Concrete is a material with mixture of cement, water, and aggregates (fine and coarse) in different ratios, which must be workable, low permeability and economical. The different grades of the concrete can be obtained by using dissimilar quantity and quality of materials in mixing the concrete.

Wood had been cut down and processed in the factory to produce different type of product such as paper, furniture and construction material. However, a lot of wastes are produced during the process to manufacture products in the furniture industries and installing the wood material in the construction process. Hence, the waste material should be reuse to make another product instead of been disposed or burned because this process will affect and destroy the natural environment. It can be used as recycled material and as substitution for the certain material in concrete mix.

This study has ventured into performance of concrete when various percentages of waste wood block as coarse aggregate replacement is added and to determine the strength and flexural behaviour of the samples. Throughout this chapter, all details about background of the study, problem statements, objectives, scope of the study and study significant will be explained to give an overview for this whole study.

1.2 BACKGROUND OF THE STUDY

Issues on waste materials from manufacture and construction sector had become a more serious problem to both environmental and mankind in the world. In Malaysia, most of the production sector and construction industry produces a lot of unwanted waste which will cause negative impact to the environment. The average number of municipal solid waste produced in one day is approximately 0.5 to 0.8 kilogram per person and, at the same time, our country is also facing problem of insufficient landfill due to lack of places for the construction of new landfills (Kathirvale et al., 2004). Thus, immediate action must be taken to handle the huge amount of waste materials, such as waste wood due to the improper waste management.

Reuse and recycling those solid waste materials like PET and wood as replacement of aggregate in concrete is one of the suggestions to reduce the amount of waste and produce low cost concrete for construction. Polyethylene terephthalate (PET) and high density polyethylene (DPE) are two type of plastic commonly used in making the mineral water bottle and other plastic products due to their light weight and long life span properties. However, most of the plastics are non-degradable, resulting in large landfill required for disposal. Thus, this plastic waste can be reused to make new and economical materials in construction industry (Siddique et al., 2008).

According to Kartam et al. (2004), the construction and demolition (C&D) waste are mainly come from building maintenance and renovate work as well as old structural buildings that been demolished. This wastes can be used as recycled products to save land area for landfill. Figure 1.1 shows the composition of C&D wastes produced from construction site, where wood waste is the fourth highest waste materials been generated. Hence, by replacing the aggregate with waste wood block, also can be done as a solution to deal with the waste accumulation and help to protect the ecosystem.

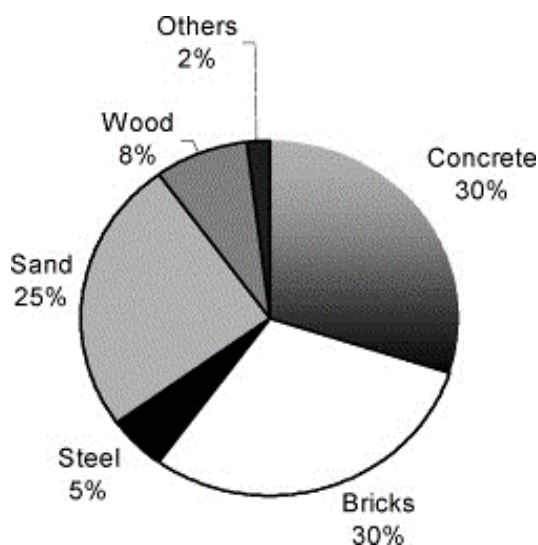


Figure 1.1: C&D wastes

Source: Kartam et al. (2004)

1.3 PROBLEM STATEMENTS

The rapid development of construction industry results in the increasing demands for the construction materials like cement and aggregate. In addition, the cost of materials in concrete mix including coarse aggregate is increasing from year to year. To deal with this problem, one of the solutions suggested is to use the waste wood block as coarse aggregate replacement with a portion by total volume of the coarse aggregate. This type of concrete can be made cheaper by replacing some of the coarse aggregate with this solid waste.

Besides that, it will also reduce the waste from the wood industries and assist in decreasing the pollution impacts on the environmental. It also helps to minimize the quarrying activities which often end up in a great negative effect on the mother earth. This replacement of aggregates will help in minimizing the wastes and reduce the quarrying activities (Henry & Kato, 2012). Thus, study on the characteristics, properties and strength of concrete with waste wood block as part of concrete mixture is conducted to determine the maximum strength of the concrete.